

#### **Rui Gardner**

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Current work webpage: <a href="http://fccf.mskcc.org/">http://fccf.mskcc.org/</a>

Lab YouTube Channel: https://www.youtube.com/flowmskcc

Lab Twitter account: @flowMSKCC



#### **PROFILE SUMMARY**



My scientific career began just before graduating in Biochemistry in 1997, as a trainee in mathematical biology. This set the ground for my doctoral work, a mathematical approach to understand the prooxidative mechanisms of superoxide dismutase, paradoxically known as one of the most powerful physiological antioxidant enzymes. Most of the work was carried out in the department of Microbiology and Immunology at the University of Michigan, but also at the University of Southern California and the Gulbenkian Institute of Science in Portugal. In 2004 I earned my PhD in Biomedical Sciences, followed by postdoctoral work on evaluating immune diversity estimation techniques, still at the Gulbenkian Institute, where in the end of 2006 I became Core Manager of the Flow Cytometry facility. In June 2016 I was hired to head the Flow Cytometry Core Facility at Memorial Sloan-Kettering Cancer Center in New York.

The Flow Cytometry Core Facility at MSKCC, consisting of myself and 8 other flow operators, currently serves around 700 researchers using six analyzers – 1 Beckman Coulter CytoFLEX LX, 2 Cytek Auroras, and 3 BD LSR Fortessas – and nine high-speed cell sorters – 2 Sony SH800 and 7 BD FACSArias. My main goal is to provide the best high-end support in Flow Cytometry and make the technology accessible to everyone in the institute as well to external research groups.

Passionate about Science and Technology, my interdisciplinary background in Mathematics, Physics, and Biology allows bridging the gap between the operational and technical details in flow cytometry and the science within flow applications. Technically driven, I am comfortable in implementing practical modifications of the flow cytometers, as well as software development, to improve assays and operation of flow equipment.

Driven by a sense of responsibility towards my peers and the flow cytometry community I've been actively involved in the Core Managers Task Force of the International Society for the Advancement of Cytometry (ISAC) since 2007 and elected for ISAC's Council from 2012-2016. I have since been involved in the establishment of several Shared Resource Lab (SRL) programs and activities and chaired the ISAC SRL Oversight Committee for the development and improvement of these programs from 2014-2016. Currently, I'm a member several ISAC committees, including the Live Education Delivery Task Force, Meetings Committee, and the Leadership Development Committee. I am also a member FlowCytometryUK, member and past councilor of the Sociedad Iberica de Citometria (SIC), and member of the FlowTex board.

#### **WORK EXPERIENCE**

#### **Memorial Sloan-Kettering Cancer Center**

2016 – present

Flow Cytometry Core Head

Management, supervision and operation of the flow cytometry and cell sorting services at the Flow Cytometry Core Facility. Staff training and supervision. Research and Development in the field of flow cytometry and cell sorting in collaboration with in-house groups.

#### Instituto Gulbenkian de Ciência, Oeiras, Portugal

2006 - 2016

Flow Cytometry Core Manager

Management, supervision and operation of the flow cytometry and cell sorting services at the Imaging Unit. Staff training and supervision. Research and Development in the field of flow cytometry and cell sorting in collaboration with in-house and external research groups.

2004 - 2006

Postdoctoral Fellow

Postdoc in the Theoretical Immunology lab. Research in mathematical modeling of regulatory T lymphocyte suppression and statistical analysis of lymphocyte diversity estimation.

2004 (3 months) Research Scientist Research at the Evolutionary Biology lab. Research on population genetics of adaptation in E. coli. 2002 - 2004Visiting Research Scientist Research at the Theoretical Immunology Lab. Research work for Ph.D. on the paradoxical effects of superoxide dismutase. Research on the dynamics of germinal centers in immune responses University of Michigan, Ann Arbor, USA 1999 - 2002Visiting Research Fellow Research at Michael Savageau's lab in the Department of Microbiology and Immunology. Ph.D. work on mathematical modeling of free radical metabolism. University of Southern California, Los Angeles, USA 2000 (3 months) Visiting Research Scientist Research at Enrique Cadenas' lab in the Department of Pharmacology and Toxicology. Experimental research work for PhD in the field of free radical metabolism. Instituto Investigação Cientifica Bencto Rocha Cabral, Lisbon, Portugal Research Fellow 1998 (6 months) Research in the Grupo de Bioquímica e Biologia Teóricas headed by Ruy E. Pinto. Research work for Ph.D. on mathematical modeling of free radical metabolism. Instituto Investigação Cientifica Bencto Rocha Cabral, Lisbon, Portugal 1996 - 1998Research Trainee Research in the Grupo de Bioquímica e Biologia Teóricas headed by Prof. Dr. Ruy E. Pinto. Research on reaction kinetics in compartmentalized systems. **EDUCATION AND TRAINING** 2004 Ph.D. in Biomedical Sciences Instituto de Ciências Biomédicas Abel Salazar, University of Porto, Portugal 1997 **Bachelor's in Biochemistry** Faculdade de Ciências, University of Lisbon, Portugal Since 2008, I have trained several staff in Flow Cytometry and Core management: **MENTORSHIP** 2008 Ana Ferro, went on to do a PhD in Biotechnology, Beja, Portugal. 2008 - 2012Telma Lopes, currently Head of Flow Cytometry at ETH in Basel, Switzerland. 2012 - 2016Cláudia Bispo, currently Flow Cytometry Core Manager at UCSF, San Francisco, USA. 2013 - 2016Cláudia Andrade, currently Head Flow Cytometry at CEDOC, Lisbon, Portugal. 2015-2016 Barbara Oliveira, Master's Student, IGC/ITQB/FCUL, Portugal. 2019-2021 Kathleen Daniels, currently Flow Cytometry Core Manager, Whitehead Institute, Boston, USA. **MASTER'S** THESIS EXAMINER 2010 Maria Rebelo Sousa, "Malarial pigment (haemozoin): Flow cytometric detection of haemozoin in infected erythrocytes to monitor drug-effects.", Master Thesis in Applied Microbiology, University of Lisbon, Portugal Cláudia Lemos e Sousa, "Hemozoin detection in Plasmodium falciparum infected RBCs by flow 2013 cytometry for monitoring the effects of antimalaria compounds.", Master Thesis in Applied Microbiology, University of Lisbon, Portugal Carolina Tempera, "Novel applications of a flow cytometric sensitivity assay for Plasmodium spp.:

Compound screening and gametocyte detection.", Master Thesis in Applied Microbiology, University of

2014

Lisbon, Portugal

<b>TEACHING AND</b>	
TRAINING	
	Over 150 lectures since 2007 on Flow Cytometry in Masters' and PhD courses, workshops, and conferences.
	Principal Flow Cytometry instructor for Flocyte ( <a href="http://www.flocyte.com">http://www.flocyte.com</a> ) and Excyte ( <a href="http://expertcytometry.com">http://expertcytometry.com</a> ), since 2013.
	Courses and workshops (co-)organized and lectured:
1998	Teaching Assistant: Practical Sessions of "Power-Law Modeling of Biological Systems" (Oeiras, October)
2009	Workshop: "Running a Core Facility in the Current Economic Climate", with John Daley, Vasilis Toxavidis, John Tigges, Suzan Lazo-Kallanian, David Cotell and Ian Dimmick, UK-Ireland Core Managers Meeting (Dublin, November)
2012	Core Managers Workshop at CYTO2012 (Leipzig, June);
	Workshop on Evaluating Instrument Performance at CYTO2012 (Leipzig, June);
	Course on Quantitative Cytometry and Cell Sorting at ESCCA (Budapest, September)
2013	Workshop on Assessing Cell Sorter Performance at FlowcytometryUK meeting (Manchester, July)
	Flow Cytometry Seminar Series at CNIO (Madrid, September)
	Course on Cell Sorting at ESCCA (Luxembourg, November)
2014	Flow Cytometry Course for PhD Program at Karolinska Institute (Stockholm, January)
	Workshop: "Telling Ain't Teaching: a guide to effective training." with Joanne Lannigan at CYTO2014 (Fort Lauderdale, May)
	Workshop: "Malaria Cytometry." with Chojnowski, G, Shapiro, HM, Grimberg, B, and Rebelo, MS at CYTO2014 (Fort Lauderdale, May)
	Workshop on Core Technology Facility staff and career development at CTLS Meeting (Paris, June)
	Workshop: "Flow Cytometry – Fundamentals and Applications" at IBMC (Porto, June)
	Course on "Cell Biology Techniques in Flow Cytometry." at ESCCA (Lisbon, September)
2015	Flow Cytometry Course for PhD Program at Karolinska Institute (Stockholm, January)
	Flow Cytometry Course at CNIO (Madrid, February)
	Cell Sorting Course at CNIO (Madrid, February)
	Flow Cytometry: Fundamentals and Applications at IGC (Oeiras, April)
	CYTO2015 Workshop: "Conflict Management" with Joanne Lannigan (Glasgow, June)
	CYTO University Webinar: "Optimizing SRL Performance-1: Boost Your Cell Sorting Capacity" (online, October)
2016	Flow Cytometry Course at CNIO (Madrid, January)
	Cell Sorting Course at CNIO (Madrid, January)
	Flow Cytometry: Fundamentals and Applications at IGC (Oeiras, January)
	CYTO2016 Workshop: "Systems for Simplifying Core Management" with Rob Salomon, Michael Thomson, and Suat Devish, at CYTO2016 (Seattle, June)
	ExCyte Webinar series: "Cell sorting" ( <i>remote</i> , August)
	NERLSCD Annual Meeting: "Getting the right users on the right equipment" (Boston, October)
2017	ICVS Workshop: "Cell functional and phenotypical analysis: the usefulness of flow cytometry and related tools", (Braga, March)
	CYTO University Webinar: "SRL Best Practices: Quality Assurance" (remote, June)
	Scientific Tutorials at the Nordic Flow Cytometry Meeting 2017: "RNA analysis using flow cytometry" (Copenhagen, August)

CYTO2018 Workshop: "Balancing Science and Service in an SRL", with Joanne Lannigan (Prague, June) Advanced Cell Sorting Course at CNIO (Madrid, February)

20th Indo-US Flow Cytometry Workshop: "Single Cell Sorting" (New Delhi, March)

2nd FLxFlow Course: Principles and Applications of Flow Cytometry (Lisbon, November)

Advanced Cell Sorting Course at CNIO (Madrid, September)

2018

2019

2020	FlowTex Webinar series: "Introduction to full spectrum flow cytometry" (remote, April)
	India Polychromatic Flow Cytometry in Monitoring of Infectious Disease meeting: "Multicolor Panel Design" ( <i>remote</i> , August)
	OpenFlow Cytometry virtual classes (collaboration with Francis Crick Institute): "Experimental Setup in Diva" (May) "Experimental voltage optimization in Diva" (June) "Fluorescence compensation in Diva" (July) "Multicolor troubleshooting in Diva" (September) "Full spectrum flow cytometry in the Cytek Aurora" (November)
2021	OpenFlow Cytometry virtual classes (collaboration with Francis Crick Institute): "Introduction to full spectrum analysis II" (January) "Introduction to cell sorting part I" (February) "Introduction to cell sorting part II" (March) "Introduction to cell sorting part III: sort troubleshooting (April)  22nd Indo-US Flow Cytometry Workshop: "Principles of Cell Sorting", (remote, February)
	ICVS Workshop: "Cell functional and phenotypical analysis: the usefulness of flow cytometry and
	related tools", ( <i>remote</i> , March)  3 <sup>rd</sup> FLxFlow Course: Principles and Applications of Flow Cytometry ( <i>remote</i> , May)
	SIC2021: Nanocytometry, cell sorting and functional assays ( <i>remote</i> , June)
	Stellenbosch University course on full spectrum flow cytometry (remote, August)
ORGANIZED MEETINGS	
1998	PowBioSys – International Symposium on Power-Law Modeling of Biologcial Systems (Oeiras, October)
2012	International Workshop on Core Management at the Gulbenkian Institute (Lisbon, July);
2013	International Workshop on Core Management at University of Algarve (Faro, September);
2014	CTLS2014 meeting (Paris, June);
2015	Scientific Committee SIC2015 meeting (Las Palmas, June) Organizing Committee of CYTO2015 (Glasgow, June)
2016	Organizing Committee of CTLS2016 (Heidelberg) Organizing Committee of CYTO2016 (Seattle, June)
2017	Organizing and Scientific Committee of SIC2017 (Lisbon, June)
2021	Organizing Committee FlowTex 2021 (remote, February)
	Scientific Committee of SIC2021 (Lisbon, June)
	Organizing Committee of CYTO2021 (remote, June)
INVITED SPEAKER	Invited speaker at international meetings held between 2011 – 2021:
2011	"Aplicações da Citometria de Fluxo na Investigação Básica", XII Congresso Técnico de Anatomia Patológica (Espinho, May)
	"Cell Sorting: Questões Práticas", IV Forum Enzifarma (Coimbra, April)
2012	"Laboratório de Citometria de Fluxo na Investigação", V Forum Enzifarma (Coimbra, February)
	"Core Facilities and their Role in Research", DGfZ Meeting, Core Managers Forum (Bonn, October)
2014	"Purity Yields to Recovery", ICyS Meeting (Dublin, February)
	Panel member in Open Discussion at Core Technology Facility staff and career development at CTLS Meeting (Paris, June)
	Panel member in the Microbiology Workshop at ESCCA2014 meeting (Lisbon, September)
	"Flow Cytometry: Fundamentals and Applications", Modern Solutions for Study of Natural, Synthetic

ExCyte Webinar series: "Principles of Spectral Flow Cytometry" (remote, August)

Sony Biotechnology Webinars: "Cell Sorting Best Practices from the Experts" (remote, October)

and Biological Materials meeting (Saint-Petersburg, October)

"Sorting out Performance", ACS meeting (Gold Coast, November)

"The role of the Core Manager in the modern SRL", Core Manager's Forum at the ACS meeting (Gold Coast, November)

"Using Rmax to Evaluate Cell Sorter Performance", Bio-Rad's Commercial Tutorial at CYTO2015 (Glasgow, June)

"Conflict Management in the SRL", IV Core Management Workshop (Lausanne, August)

"Rmax: Protocol and uses", Big Apple Flow Cytometry Network meeting (New York, October)

"Quando a Ciência e Tecnologia se Juntam...", Integrated Masters' in Biomedical Engineering.

2017 "Cutting edge tools for cell sorting", Nordic Flow Cytometry Meeting 2017, (Copenhagen, August)

2018 "Cutting edge tools for cell sorting", 11<sup>th</sup> Annual FlowTex Conference (Houston, February)

"Cutting edge tools for cell sorting", 9th Annual Meeting of the Southeast Flow Cytometry Interest Group, SEFCIG (Memphis, April)

"Introduction to Full Spectrum Flow Cytometry", 2<sup>nd</sup> Swiss Cytometry Meeting (Lausanne, February)

"Challenges in Implementing Full Spectrum Flow Cytometry", Aurora Users' Group Meeting, (New York, February)

Ask the Experts - A Solid Foundation for Simpler and Smarter Flow Cytometry Panel Design, BD Biosciences: https://www.youtube.com/watch?v=Hq2cfdjJtG8 (remote, July)

"Bridging Science and Sales: Establishing a win-win relationship with vendors", Royal Microscopy Society Virtual Flow Cytometry Facilities Meeting 2021 (remote, January)

"Controls in multiparameter flow cytometry", 14th Annual FlowTex Conference (remote, February)

### OTHER QUALIFICATIONS

2021

- FACSAria Operator Training, Feb 26-Mar 02, 2007, Erembodegem, Belgium
- ABRF Business Skills Workshop, Feb 19-20, 2016, Ft. Lauderdale, USA

# OTHER TECHNICAL SKILLS, COMPETENCES, AND ACHIEVEMENTS

- Reviewer for several scientific journals, including the Journal of Theoretical Biology, Journal of Immunological Methods, and Cytometry Part A.
- Chief Guest Editor of special edition in Cytometry Part A on "Full Spectrum Flow Cytometry" to be published at the end of 2021.
- Member of the Scientific Advisory Board for FluoroFinder
- Member of the External Advisory Board for the Flow Cytometry and Cellular Imaging Core Facility at MD Anderson, Texas, USA.
- Proficient in mathematical modeling techniques in Biology.
- Software development (laser monitoring software, scripting for data management and instrument QC).
- Advanced cross-platform knowledge (MS Windows XP/Vista/7, Mac OS 9/X, Linux, and Unix) and proficient programmer in several languages including R, C, Visual C++, Python, Perl, PHP, OpenGL, Mathematica (Wolfram), Maple, among others.
- Webpage developer, including the webpage of the Imaging Unit at the Instituto Gulbenkian de Ciência
- English Advisor/Reviewer for the Estudos Avançados de Oeiras at the Instituto Gulbenkian de Ciência.
- Former technical translator for Pfizer Portugal (English-Portuguese and Portuguese-English)

## LANGUAGE SKILLS AND INTERNATIONAL EXPOSURE

**PORTUGUESE & ENGLISH:** Native Languages. Excellent reading, writing and verbal skills **SPANISH** Moderate reading, writing and verbal skills

Lived and worked in the US (Michigan and California) for 4 years.

#### **BIBLIOGRAPHY**

Published or In Press

- Ricardo Alvim, Petrina Georgala, Lucas Nogueira, Alexander J, Somma, Karan Nagar, Jasmine Thomas, Laura Alvim, Amelia Riegel, Christopher, Hughes, Jie Chen, Augusto B Reis, Souhil Lebdai, Steven Zanganeh, Rui Gardner, Avigdor Scherz, Kwanghee Kim, Jonathan A. Coleman (2021) "Combined OX40 Agonist and PD-1 Inhibitor Immunotherapy Improves the Efficacy of Vascular Targeted Photodynamic Therapy in a Urothelial Tumor Model" *Molecules*, 26(12):3744. doi: 10.3390/molecules26123744
- Claúdia Andrade, Bárbara Oliveira, Silvia Guatelli, Pedro Martinez, Beatriz Simões, Claúdia Bispo, Cinzia Ferrario, Francesco Bonasoro, José Rino, Michela Sugni, Rui Gardner, Rita Zilhão and Ana Varela Coelho (2021) "Characterization of Coelomic Fluid Cell Types in the Starfish Marthasterias glacialis Using a Flow Cytometry/Imaging Combined Approach" Frontiers in Immunology, doi:10.3389/fimmu.2021.641664
- 3. Kathy Daniels, Alexis Conway, <u>Rui Gardner</u>, Lola Martinez, Kylie M. Price, Sarah Schneider, Rachael Sheridan, Jane Srivastava, Sherry Thornton (2021) "Remote Training of SRL Users and Staff in a Global Pandemic" *Cytometry A*, **99A**:42-50. <u>doi:10.1002/cyto.a.24262</u>
- Mariya G Morris, Rodolfo J Ricart Arbona, Kathleen Daniels, <u>Rui Gardner</u>, Imaani Easthausen, William L Boteler, Gregory P Baseler, Gabrielle Pastenkos, Cheryl L Perkins, Kenneth S Henderson, Andrea Schietinger, Neil S Lipman (2020) "Mite Burden and Immunophenotypic Response to Demodex musculi in Swiss Webster, BALB/c, C57BL/6, and NSG Mice" *Comparative Medicine*, 70(4):336-348. doi:10.30802/AALAS-CM-19-000097
- Kamila Czechowska, Joanne Lannigan, Lili Wang, Judith Arcidiacono, Thomas M. Ashhurst, Ruth M. Barnard, Steven Bauer, Cláudia Bispo, Diana L. Bonilla, Ryan R. Brinkman, Maciej Cabanski, Hyun-Dong Chang, Lina Chakrabarti, Grace Chojnowski, Bunny Cotleur, Heba Degheidy, Gelo V. Dela Cruz, Steven Eck, John Elliott, Rachel Errington, Andy Filby, Dominic Gagnon, Rui Gardner, Cherie Green, Michael Gregory, Christopher J. Groves, Christopher Hall, Frederik Hammes, Michael Hedrick, Robert Hoffman Jaroslav Icha, Johanna Ivaska, Dominic C. Jenner, Derek Jones, Frederiek-Maarten Kerckhof, Christian Kukat, David Lanham, Silas Leavesley, Michael Lee, Sheng Lin-Gibson, Virginia Litwin, Yanli Liu, Jenny Molloy, Jonni S. Moore, Susann Müller, Jakub Nedbal, Raluca Niesner, Nao Nitta, Betsy Ohlsson-Wilhelm, Nicole E. Paul, Stephen Perfetto, Ziv Portat, Ruben Props, Stefan Radtke, Radhika Rayanki Aja Rieger, Samson Rogers, Peter Rubbens, Robert Salomon, Matthias Schiemann, John Sharpe, Soren Ulrik Sonder, Jennifer J. Stewart, Yongliang Sun, Henning Ulrich, Gert Van Isterdael, Alessandra Vitaliti Caryn van Vreden, Michael Weber, Jakob Zimmermann, Giacomo Vacca, Paul Wallace, Attila Tárnok (2019) "Cyt-Geist: Current and Future Challenges in Cytometry: Reports of the CYTO 2018 Conference Workshops" Cytometry A, 95A:598-644. doi:10.1002/cyto.a.23777
- Jose Faro, Bernardo von Haeften, <u>Rui Gardner</u> and Emilio Faro (2019) "A Sensitivity Analysis Comparison of Three Models for the Dynamics of Germinal Centers" *Front. Immunol.*, doi:10.3389/fimmu.2019.02038
- 7. Sonja Nowotschin, Manu Setty, Ying-Yi Kuo, Vincent Liu, Vidur Garg, Roshan Sharma, Claire S. Simon, Nestor Saiz, <u>Rui Gardner</u>, Stéphane C. Boutet, Deanna M. Church, Pamela A. Hoodless, Anna-Katerina Hadjantonakis & Dana Pe'er (2019) "The emergent landscape of the mouse gut endoderm at single-cell resolution" *Nature*, **569**: 361-367. <u>doi:10.1038/s41586-019-1127-1</u>
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- Nunes Santos (2017) "Blood-brain barrier permeability and neuroprotective potential of blackberry-digested polyphenols", *European Journal of Nutrition*, **58**:113-130. <u>doi:10.1007/s00394-017-1576-y</u>
- Dmitry Pankov, Ludvig Sjöström, Teja Kalidindi, Sang-Gyu Lee, Kjell Sjöström, <u>Rui Gardner</u>, Michael R. McDevitt, Richard O'Reilly, Daniel L.J. Thorek, Steven M. Larson, Darren Veach and David Ulmert (2017) "In vivo immuno-targeting of an extracellular epitope of membrane bound preferentially expressed antigen in melanoma (PRAME)", Oncotarget. <u>doi:10.18632/oncotarget.19579</u>
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